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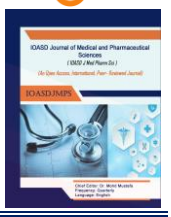

Topical Vitamin D_3 (Cholecalciferol) in Enhancing Recovery and Management of Thermal Burns

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ABSTRACT

Thermal burns present significant challenges in wound healing and management due to extensive tissue damage and a high risk of infection, which can impede recovery. Such wounds often exhibit deficiencies in essential chemokines and growth factors, necessitating external supplementation to support healing. This article explores the potential role of topical cholecalciferol (vitamin D_3) in managing thermal burn wounds. ***Materials and Methods:*** This case report describes the treatment of a 35-year-old male with a thermal burn on the dorsal aspect of the right hand. The wound exhibited signs of delayed healing despite standard care. Topical cholecalciferol was applied during routine dressing changes, and the wound's progress was monitored over four weeks. ***Results:*** The wound demonstrated significant improvement, with visible evidence of healing and reduced infection risk. ***Conclusion:*** Topical cholecalciferol shows promise as an adjunct therapy for enhancing wound healing in thermal burns. However, further studies involving larger patient populations are needed to validate its clinical effectiveness.

Keywords: Thermal burns, wound healing, topical cholecalciferol, vitamin D_3, burn management, infection control, delayed healing, growth factors, case report, granulation tissue, adjunct therapy.

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INTRODUCTION

Wound bed preparation has emerged as a pivotal approach to accelerate wound healing, focusing on infection control and supplementation of growth factors. Several modalities, such as autologous platelet-rich plasma (APRP), platelet-rich fibrin matrix (PRFM), topical insulin, and prolotherapy, have been explored to enhance wound healing. Recently, the use of topical cholecalciferol (vitamin D_3) has shown potential in wound management. This case report highlights the application of topical cholecalciferol in managing a residual raw area following thermal burns in a single patient.

MATERIALS AND METHODS

This study was conducted in the Department of Plastic Surgery at a tertiary care center with approval from the departmental ethics committee. Written informed consent was obtained from the patient. The case involved a 42-year-old male with no significant comorbidities, presenting with a history of accidental thermal burns sustained from a gas cylinder. The patient developed a residual raw area on the lateral aspect left leg (fig 1) after initial debridement and standard wound care failed to achieve healing.

Figure 1: Residual raw area on the lateral aspect left leg

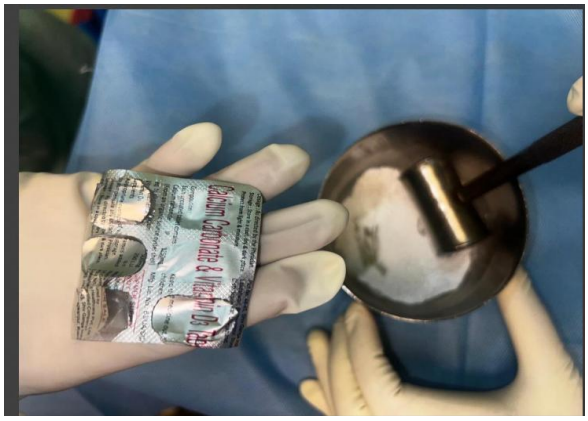

Figure 2: Topical cholecalciferol granules

Topical cholecalciferol granules (fig 2) were applied to the wound following debridement. A non-adherent dressing was placed over the application site, and dressings were changed every three days. This regimen was repeated over four weeks, with a total of eight applications of topical cholecalciferol.

RESULTS

The wound exhibited progressive improvement, with the development of healthy granulation tissue within the first two weeks. By the end of four weeks, the wound bed showed significant healing, with reduced inflammation and improved epithelialization.

DISCUSSION

Burn injuries, particularly thermal burns, pose a significant challenge due to prolonged healing times and increased risk of infection. Although advancements in burn care have reduced mortality rates, delayed wound healing remains a major concern. Thermal burns often result in tissue necrosis, loss of vascularity, and an increased inflammatory response, necessitating interventions to promote healing.

Vitamin D, particularly in its active form (cholecalciferol), plays a critical role in calcium homeostasis and immune modulation. Topically applied vitamin D has been shown to enhance keratinocyte migration, increase chemokine production (e.g., IL-8), and promote the synthesis of antimicrobial peptides such as defensins and cathelicidins. These properties contribute to improved wound healing by reducing inflammation and promoting epithelialization (1, 6, 7).

Cholecalciferol has also been studied for its effectiveness in healing diabetic wounds and corneal wounds, demonstrating its potential in chronic wound scenarios (5, 6). Moreover, topical antimicrobial delivery systems such as gentamicin in collagen dressings and minocycline in chitosan-polyurethane foams have proven effective in wound care (2, 4). This case further supports the utility of vitamin D as an adjunctive therapy for wound management.

CONCLUSION

Topical cholecalciferol appears to be a promising adjunctive therapy for managing residual raw areas in thermal burn wounds. However, this case report represents a single patient experience. Larger, population-based studies are needed to validate these findings and determine the broader clinical applicability of cholecalciferol in wound care.

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